National Institute of Environmental Health Sciences

Exploration of health risks related to air pollution and temperature in three Latin American cities

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Abstract:

This paper explores whether the health risks related to air pollution and temperature extremes are spatially and socioeconomically differentiated within three Latin American cities: Bogota, Colombia, Mexico City, Mexico, and Santiago, Chile. Based on a theoretical review of three relevant approaches to risk analysis (risk society, environmental justice, and urban vulnerability as impact), we hypothesize that health risks from exposure to air pollution and temperature in these cities do not necessarily depend on socio-economic inequalities. To test this hypothesis, we gathered, validated, and analyzed temperature, air pollution, mortality and socioeconomic vulnerability data from the three study cities. Our results show the association between air pollution levels and socioeconomic vulnerabilities did not always correlate within the study cities. Furthermore, the spatial differences in socioeconomic vulnerabilities within cities do not necessarily correspond with the spatial distribution of health impacts. The present study improves our understanding of the multifaceted nature of health risks and vulnerabilities associated with global environmental change. The findings suggest that health risks from atmospheric conditions and pollutants exist without boundaries or social distinctions, even exhibiting characteristics of a boomerang effect (i.e., affecting rich and poor alike) on a smaller scale such as areas within urban regions. We used human mortality, a severe impact, to measure health risks from air pollution and extreme temperatures. Public health data of better quality (e.g., morbidity, hospital visits) are needed for future research to advance our understanding of the nature of health risks related to climate hazards.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Air Pollution

Air Pollution: Interaction with Temperature, Ozone, Particulate Matter, Other Air Pollution

Air Pollution (other): NO2

Geographic Feature:

resource focuses on specific type of geography

None or Unspecified

Geographic Location: ☑

resource focuses on specific location

Non-United States

Non-United States: Central/South America, Non-U.S. North America

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Morbidity/Mortality, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): cardiovascular mortality

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory mortality

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Children, Elderly, Low Socioeconomic Status

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified

Vulnerability/Impact Assessment: ☑

resource focus on process of identifying, quantifying, and prioritizing vulnerabilities in a system

A focus of content